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the records and results must be guarded from possible bias. This cannot be done in complex factory statistics by means of the *questionnaire* method of inquiry, but it can be done and is being done by the much more difficult and more scientific procedure of analysis of factory records, which are either available now or could be made available for industrial experimentation.

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The Human Machine and Industrial Efficiency. By FREDERIC S. LEE. (New York: Longmans, Green and Company. 1918. Pp. 119. \$1.10.)

The trade-union slogan of a fair day's pay for a fair day's work has always been difficult to apply both as to time and as to wages. The result has been guessing at half and multiplying by two. Often the waste of human material in putting a man at the wrong job has been great. Professor Lee in this volume proposes a science of industrial physiology based upon the facts of present-day industry. The experience of Great Britain in the war munitions factories has been largely drawn upon. The activity of the human body, which plays so large a part in industry, must be organized on a physiological basis before the highest degree of efficiency can be secured. In other words, a science of the human machine must be developed in industrial establishments through observation and experiment.

Most of the substance of the book was given in two lectures at the Harvard Medical School and is now presented in seventeen short chapters on what may be called the use of human machinery without which mechanical machinery is of little value. Certain fundamental conditions of coördination between the worker and his work must be observed. These include the following:

1. Workers should be qualified for the work that they are to do.
2. Workers should produce a daily output in accordance with their individual capacities for work.
3. Workers should maintain their working power from day to day and from week to week.
4. Workers, once they have proved competent, should be retained.

Most of these points are merely axiomatic; the difficulty has been to translate them into actual practice. Professor Lee brings out clearly the various tests for vocational fitness, although, as he says, these methods are not very exact as yet. Fatigue is per-

haps the greatest enemy to high production and therefore much attention must be given to this subject in any study of industrial efficiency. The length of the working day is thus important and the best number of hours in various industries should be determined by scientific investigation. The practice of what is called in this country "soldiering" and in Great Britain "ca'canny," or self-limitation of output, is condemned as one of the most potent and most universal foes to efficiency. The causes are various, but the cutting of piece rates is said to be the principal one. The keeping of a fair rate between the employer and employee should be observed.

The study is of considerable scientific merit and one of its most valuable features is its numerous suggestions for further study. A rather complete bibliography shows what has already been done in the field.

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NEW BOOKS

ANGELL, N. *The British revolution and the American democracy; an interpretation of British labor programmes.* (New York: Huebsch. 1919. Pp. 319. \$1.50.)

BENN, E. F. P. *The trade of to-morrow.* (New York: Dutton. 1918. Pp. 232.)

In *The Trade of Tomorrow* the author brings together a number of his scattered ideas regarding solutions of present-day problems of labor and capital. In the introduction he gives us a criticism which is not ill-founded from a scientific point of view when he writes: "This book is not a treatise on economics. The only argument in it is an argument for the admission of industry to a place in the Constitution and its organization upon a representative basis. It comes into the class of propagandist literature and expresses somewhat incoherent views of that peculiar creature, commonly known as the business man." Although Mr. Benn urges the formation of a Ministry of Commerce and Industry for the purpose of encouraging and facilitating British trade, much more emphasis is laid upon the creation of a Trade Council in connection with each industry, to which questions might be referred. Two-thirds of the members of such councils would be drawn from trade associations and trade unions; the remaining third would consist of government officials and scientific experts. Considerable attention is given to trade organizations, including export associations. In dealing with foreign organizations, such as German cartels and American trusts, the author gives some evidence of proceeding upon an insufficient basis of fact. Nevertheless, some of the suggestions developed in